OBJECTIVES: Evaluate comparative effectiveness and economic impacts of banked donor milk for premature infants to support evidence-based decision-making for implementing a public milk bank managed by a blood bank in the province of Québec. **METHODS:** A systematic review of the literature was performed to identify clinical benefits of banked donor milk compared to formulas for reducing complications in preterm or very low birth weight (VLBW) infants. Epidemiology and costs of these complications were obtained from provincial databases (Régie de l'Assurance Maladie du Québec; Ministère de la Santé et des Services Sociaux) to estimate the economic impact of using banked donor milk in this vulnerable population. Milk bank budget was estimated in the context of the Québec blood bank. **RESULTS:** Evidence available indicates that the major benefit associated with the use of banked donor milk compared to formula in premature or VLBW infants is a reduction by 70% of the rate of necrotizing enterocolitis (NEC). Based on historical data, the incidence rate of NEC in the province of Québec, Canada, was of 70 cases during a one year-period between 2008 and 2009 which resulted in total direct costs of 2010US$5,426,128 for the Québec healthcare system. It is estimated that the use of banked donor milk in neonatology would reduce the number of NEC cases by 49 and the number of fatalities by 12 annually, resulting in potential savings. It is proposed that implementing a public milk bank in a blood bank setting would result in economic efficiencies **CONCLUSIONS:** Findings of the present study underlines the clinical benefits of banked donor milk compared to formulas in reducing the incidence of NEC in premature infants. Implementing a public milk bank in a blood bank setting could be clinically and economically beneficial.

PIH5

RISK OF HIP AND SUBTROCHANTERIC OR DIAPHYSEAL FEMORAL FRACTURES IN ALENDRONATE USERS

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OBJECTIVES: Atypical femoral diaphyseal fracture and long-term alendronate use may be linked. The protective effect and the risk of atypical femoral fracture of alendronate and other anti-osteoporosis drugs in older Taiwanese women were evaluated. **METHODS:** A population-based retrospective cohort was obtained from the 2000 to 2009 Taiwan National Health Insurance (NHI) data. Subjects hospitalized with vertebral or hip fracture to 2007 were selected using 2000 as a run-in year to identify incident osteoporotic fractures. All patients receiving alendronate, raloxifene, calcitonin salmon, or teriparatide after index fracture diagnosis formed the treated cohort. An untreated cohort was obtained accordingly. Patients were followed until endpoint (hospitalization for hip fracture or atypical femoral diaphyseal fracture) or end of study period. Cox proportional hazards models were used to assess the association between alendronate and other anti-osteoporosis drugs and fracture risks. **RESULTS:** Among the 11,278 patients (mean age, 77 years), 2,425 (21.5%) received alendronate (mean follow-up, 1228±797 days), 2,694 (23.9%) received other anti-osteoporosis drugs (mean follow-up, 1069±639 days), and 6,159 (54.6%) remained untreated (mean follow-up, 1357±835 days). Head-to-head comparisons revealed alendronate's superiority (HR 0.77, 95% CI 0.62–0.95) over other anti-osteoporosis drugs in hip fracture prevention. The risk of subsequent hip fracture was significantly reduced (adjusted HR 0.27, 95% CI 0.15–0.78) in long-term alendronate users. Risk of atypical femoral fracture was similar for alendronate versus other anti-osteoporosis drugs (adjusted HR 0.49, 95% CI 0.40–1.47). Short- or long-term alendronate use was not associated with higher risk of atypical femoral fractures. **CONCLUSIONS:** Alendronate poses no greater risk of atypical femoral fracture than other agents, and its benefits in reducing hip fracture risk significantly outweigh this concern.

PIH6

THE DEFINITION AND PREVALENCE OF PSYCHOTROPIC POLYPHARMACY IN MEDICAID CHILDREN AND ADOLESCENTS

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OBJECTIVES: This study evaluated the persistent use of psychotropic polypharmacy and characterized how well the cross-sectional operational definitions of polypharmacy used in published pediatric studies accurately identify patients' prescribed long-term treatment. **METHODS:** The prevalence of psychotropic polypharmacy was defined as receiving ≥ 14 days, ≥ 30 days, ≥ 60 days, and ≥ 90 days of overlapping psychotropic prescription fills. Descriptive analysis was used to compare the prevalence findings based on Multistate Medicaid data involving children and adolescents 6 to 18 years of age. A sensitivity analysis was conducted to further explore the extent to which the cross-sectional operational definitions of polypharmacy used in published literature identified patients who were prescribed psychotropic combinations on a long-term basis. **RESULTS:** Analysis of Multistate Medicaid data revealed that 218,696 children and adolescents filled at least one psychotropic prescription in 2005. Of these patients, 22.52% received psychotropic combinations for ≥14 consecutive days. The observed rate of polypharmacy dropped to 21.07% with ≥30 days overlap criterion and to 16.44% with 60 days overlap criterion. 25%-60% of patients with polypharmacy in cross-sectional definitions were likely receiving two or more psychotropic agents on a short-term basis.. Furthermore, cross-sectional definitions failed to identify a 40% to 70% of patients on long-term polypharmacy (≥60 day overlap). **CONCLUSIONS:** The long-term use of psychotropic polypharmacy in Medicaid children and adolescents in this study appeared modest. The comparison between our observations and previous studies illustrate the considerable problems that arise when comparing rates of polypharmacy across studies with inconsistent operational definitions.

PIH7

POTENTIALLY INAPPROPRIATE MEDICATION USE AMONG OLDER ADULTS IN THE UNITED STATES IN 2007

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OBJECTIVES: To determine the prevalence of potentially inappropriate medication (PIM) use among older adults in the USA in 2007 and compare the prevalence to that in 1996, and to identify risk factors for PIM use. **METHODS:** Primary data source was the 2007 Medical Expenditure Panel Survey. This is a nationally representative survey of the U.S. community-dwelling population. Study subjects were those respondents aged 65 or older. A retrospective cohort study was conducted. PIMs were identified according to the Zhan criteria. Prevalence rates of the 33 PIMs utilization by medications and respondents' characteristics were determined. Risk factors for PIM use were examined using logistic regression after controlling for confounding factors. **RESULTS:** The 33 PIMs use on the Zhan list declined between 1996 and 2007. In 2007, 13.8% (95% confidence interval [CI], 12.5%–15.2%) of the elderly or 5.4 million older adults received at least 1 of the 33 PIMs; and 1.5% (95% CI, 1.1%–2.0%) used at least 1 of the 11 PIMs that should always be avoided. The most commonly misused medications were propoxyphene, amitriptyline, antihistamines, diazepam, muscle relaxants, gastrointestinal antispasmodics, and indomethacin. High-risk older patients for PIM use included women, people in the South, persons receiving more prescriptions, and those who rated their health status as fair and poor. Comparing to data in 1996, the prevalence of PIMs decreased from 6.9 million to 5.4 million although the top three PIMs remained propoxyphene, amitriptyline and promethazine. The older people who took at least 1 of the 11 PIMs declined from 0.84 million to 0.59 million. **CONCLUSIONS:** The 33 PIMs use in older Americans decreased but was still prevalent in some subgroups and for some drugs. Drug utilization review for elderly population is still needed.

Individual's Health – Cost Studies

PIH8

THE ECONOMIC IMPACT ATTRIBUTABLE TO THE INAPPROPRIATE PRESCRIPTION OF BENZODIAZEPINES IN THE ELDERLY LIVING IN THE COMMUNITY

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OBJECTIVES: The purpose of this study is to describe health service use and related costs associated with potentially inappropriate prescriptions (PIP) of benzodiazepines (BZD) in the elderly living in the community in the province of Quebec, Canada. **METHODS:** The cohort consisted of a representative sample (n=2494) of Quebec's community-dwelling elderly (>65 years of age) respondents of the ESA survey (Survey on older adult's mental health, 2006). The cost analysis was carried out from a healthcare system perspective and the definition of the PIP of benzodiazepines was based on Beers' criteria (Fick, 2003). Multivariate regression analyses were carried out to assess the influence of PIP of BZD on healthcare costs in the elderly. **RESULTS:** 30% (n=744) of participants were using BZD and 45% (n=331) of the users received at least one PIP. Higher healthcare costs (14196$ vs. 9992$; $p<0.0001$) were observed for participants with the presence of PIP of BZD in comparison with those without PIP. When individual and health care system factors were controlled, health care costs were still higher for BZD users with PIP without being statistically significant at a 95% level (β (log($)) = 0.109; IC95: [-0.040, 0.259]; Δ $: 1180$). Factors associated with higher healthcare costs were gender and physical health status. **CONCLUSIONS:** Using both administrative and survey data, this study provides new data that will help decision makers better understand the economic impact associated with the inappropriate prescriptions of BZD. The significant association between the PIP of BZD and the healthcare costs observed in the univariate analysis seems to be mainly explained by the patient's physical health status. Nonetheless, with the current economic and clinical context, particular attention should be given to the inappropriate prescriptions of BZD, affecting 45% of users and 14% of the senior population in Québec.

PIH9

COSTS TO THE NATIONAL HEALTH INSURACE SCHEME OF THE FREE MATERNAL HEALTH SERVICE CHALLENGES AND IMPLICATIONS FOR SUSTAINABILITY IN GHANA

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OBJECTIVES: The main objective of this study was therefore to examine the cost of the free maternal health services to the southern part of Ghana and explore factors that contribute to these costs. **METHODS:** Available routine financial claim records for 2009 were used to compile the cost information for the various maternal services using a compilation sheet for the three national insurance scheme accredited facilities and the scheme office in the area. The financial cost of antenatal, postnatal, delivery, abortion and the overall costs of all the maternal health services were obtained by facility type for both services and drugs. **RESULTS:** Among other findings, we found that average cost for Ridge hospital antenatal GH¢14.28(US$9.85), postnatal GH¢63.54(US$43.82) and normal deliveries GH¢51.03(US$35.19) whereas that for Adabraka Polyclinic antenatal GH¢15.12(US$10.43), postnatal GH¢24.03(US$16.58) and normal deliveries GH¢37.64(US$25.96). The results of the study showed that GH¢1,358,647.98(US$936,998.61) was spent in 2009 for maternity services for Osu-Klottey sub-metro and this represented about 7.7% of expenditure of the British Grant. The financial cost of antenatal care was GH¢289,094.96(US$199,375.83), postnatal care was GH¢159,913.34(US$110,285.06) and spontaneous vaginal delivery was

GH¢205,452.58 (US $141,691.44). **CONCLUSIONS:** This study showed that average costs of maternity services were consistently higher at hospitals. The lower health facilities were under utilized.

PIH10

HEALTH CARE RESOURCE UTILIZATION AND COSTS IN FEMALES WITH NEWLY DIAGNOSED HEAVY MENSTRUAL BLEEDING: AN EMPLOYER'S PERSPECTIVE

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OBJECTIVES: Cost burden of menorrhagia or heavy menstrual bleeding (HMB) has not been well documented. This study evaluated the healthcare resource utilization, work productivity loss, and costs associated with newly diagnosed HMB using a large employer database. **METHODS:** An analysis was conducted of health insurance claims (1998-2009) from 40 self-insured companies across the US. Women aged 18-52 years with ≥2 diagnosis claims of HMB (ICD-9: 626.2, 627.0) within 6 months as of the date of the first HMB diagnosis ("index date") and continuously enrolled for ≥6 months prior to the index date were matched 1:1 with controls (no-HMB) based on exact matching factors and propensity scores. Exclusion criteria were diagnosis of cancer, pregnancy/delivery, clinician-identified uterine conditions, endometrial ablation or hysterectomy, diagnosis of organic causes of HMB, and dispensing of anticoagulant medications. All-cause healthcare resource utilization and costs were compared between the HMB and no-HMB control cohorts using statistical methods accounting for matched study design. **RESULTS:** The HMB and no-HMB cohorts (31,308 women in each group) were well-matched with respect to age, year of index date, region, comorbidities, and baseline costs. During follow-up, HMB patients had significantly higher all-cause resource utilization than no-HMB patients (hospitalization: incidence rate ratio [IRR]=2.68, 95% CI:2.59-2.76, p<.0001; emergency room: IRR=1.36, 95% CI:1.33-1.40, p<.0001; outpatient: IRR=1.29, 95% CI:1.28-1.29, p<.0001]. Average annualized (per-patient-per-year) all-cause healthcare and work productivity loss costs were also significantly higher for HMB patients compared to the no-HMB group ($6,275 vs. $3,740, cost difference=$2,535, p<.0001). Costs associated with HMB claims represented 50% ($1,261) of the all-cause cost difference between the two cohorts. The most prevalent initial treatment following diagnosis of HMB was endometrial ablation (45% of patients). **CONCLUSIONS:** In this large matched-cohort study, a diagnosis of HMB was associated with significantly higher healthcare resource utilization and costs.

PIH11

COST ANALYSIS OF TOTAL PARENTERAL NUTRITION IN THE NEONATAL AND PEDIATRIC CARE IN BELGIAN HOSPITALS

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OBJECTIVES: Parenteral nutrition (PN) is critical for neonatal care and for infants who are unable to tolerate oral or enteral feeding during this important growth period. PN for these populations is highly complex and involves a multidisciplinary approach. This study aims to assess the total cost of compounded PN therapy for neonates, infants, and children. **METHODS:** A cost-model was constructed to assess total costs of PN therapy including prescribing, compounding, and administration. This tool was piloted in 3 Belgian hospitals, with a total of 763 patients and 7,488 compounded bags annually. Data were collected via literature review and face-to-face interviews in 12 hospitals in 4 countries (Belgium, France, Germany, and UK) about resource-utilization and costs. The variable and fixed costs such as ingredients, consumables, equipment, staff-time were included. Overall costs of hospital PN-therapy were calculated from expenditures. Staff-time spent preparing PN was measured to determine personnel costs; bottom-up costing was used to assign a monetary value using published list-prices. **RESULTS:** In these hospitals, 93% of all PN bags were compounded in-hospital (either in the pharmacy or on the ward), and 7% were industrially manufactured. The daily total cost of one bag of in-hospital compounded PN equaled €51.68 (weighted average by PN days) per neonate across all weight groups. Consumables accounted for 25% of total costs, ingredients 21%, equipment 4% and wages 50%; 22 minutes of staff-time per PN was uniquely attributable to compounding, not including time required for prescribing and supplementation. Average costs per bag using pharmacy compounding for children <2 yrs was €71.47, and for children 2-18 years €71.03, of which 45% were attributed to ingredients and 35% to wage-costs, respectfully. **CONCLUSIONS:** The data showed that a significant proportion of the total cost of PN was due to staff-time. Ready prepared PN could reduce staff-time spent on compounding for patient-related activities.

PIH12

INPATIENT COSTS OF LOW BIRTH WEIGHT AND PRE-TERM INFANTS IN THE UNITED STATES IN 2008

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OBJECTIVES: Despite efforts to decrease the incidence of low birth weight (LBW) and pre-term infants, rates for these conditions have continued to rise in recent years. The objective of this study was to determine the recent prevalence of and burden associated with hospitalizations among LBW and pre-term infants in the United States (US). **METHODS:** This study used data from the 2008 Healthcare Cost and Utilization Project Nationwide Inpatient Sample. Hospital stays were selected for inclusion if the patient was aged ≤1 year old. Stays were broken into three categories: LBW/pre-term stays (any diagnosis with an ICD-9-CM code of 764.xx, 765.xx, and V21.3x), uncomplicated newborn stays (primary diagnosis with an ICD-9-CM code between V30 and V39.2), and all other infant stays. LBW/pre-term stays were stratified by infants weighing less than or greater than 2,500 grams. Study measures were weighted and included demographics, hospital characteristics, length of stay (LOS), and costs. **RESULTS:** In 2008 there were 499,473 stays for LBW/pre-term infants, representing 10% of all infant stays. The average LOS for LBW/pre-term infants was 11.9 days, versus 2.3 days among infants with an uncomplicated newborn stay, and 4.2 days among all other infant stays. LBW/pre-term infant stays resulted in costs of more than $9.7 billion, or approximately 45% of all costs for all infant stays, and nearly 1.7 times the costs of uncomplicated newborn stays. Patients with a birth weight less than 2,500 grams had costs that were approximately 3.9 times greater than costs for patients with a birth weight greater than 2,500 grams (mean [SE] $23,382 [$1,220] versus $5,951 [$350] among patients with a birth weight less than versus greater than 2,500 grams, respectively). **CONCLUSIONS:** While LBW/pre-term infant stays represent a small percentage of all infant hospitalizations, they accrue almost half of all inpatient costs among infants.

PIH13

THE COST-EFFECTIVENESS OF THE LEVONORGESTREL-RELEASING INTRAUTERINE SYSTEM (LNG-IUS, MIRENA®) FOR THE TREATMENT OF HEAVY MENSTRUAL BLEEDING IN THE UNITED STATES

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OBJECTIVES: To evaluate the cost-effectiveness of the LNG-IUS compared with other therapies for the treatment of heavy menstrual bleeding (HMB) in the United States (US). **METHODS:** A microsimulation model examined the five-year treatment experiences of 1,000 hypothetical women with HMB from a US payer perspective. Women could begin treatment with LNG-IUS, four oral agents (generic combined oral contraceptives (COCs), branded COCs, oral progestogens, or tranexamic acid) or surgery (endometrial ablation or hysterectomy). Women who failed a non-surgical treatment line could switch to another non-surgical or surgical therapy (up to three non-surgical treatment lines were allowed). Women who failed all non-surgical treatment lines had the option of surgery as a fourth-line treatment. Treatment success was defined as menstrual blood loss < 80 milliliters per menstrual cycle (data were obtained from recent literature). Women could also experience adverse events, unintended pregnancy, or discontinue treatment during any treatment line (probabilities of these events varied by treatment). Response to treatment was evaluated every three months. The outcome of interest was cost per hysterectomy avoided. Robustness of model results was tested in Monte Carlo probabilistic sensitivity analyses. **RESULTS:** Initiating HMB treatment with LNG-IUS dominated all other strategies: it was the least costly ($1,253 per woman) and resulted in fewer hysterectomies (6 per 1,000 women) compared with the other strategies (costs ranged from $2,291 for generic COCs to $18,219 for hysterectomies; number of hysterectomies per 1,000 women ranged from 9 for ablation to 96 for progestogens). Two years of treatment with LNG-IUS was less costly and more effective than other treatments, except for ablation, which was more costly but more effective than LGN-IUS. Sensitivity analyses confirmed these results. **CONCLUSIONS:** Initiating treatment after five years with LNG-IUS results in fewer hysterectomies and is a cost-saving, or highly cost-efficient, treatment for HMB compared with strategies beginning with oral therapies or surgery.

PIH14

PROJECTING THE POTENTIAL COST-EFFECTIVENESS OF UNIVERSAL ACCESS TO MODERN CONTRACEPTIVES IN UGANDA

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OBJECTIVES: Over two thirds of women who need contraception in Uganda lack access to modern effective methods. This study was conducted to estimate the potential cost-effectiveness of achieving universal access to modern contraceptives in Uganda by implementing a hypothetical New Contraceptive Program (NCP) from both societal and governmental perspectives. **METHODS:** A Markov model was developed to compare the NCP to the status quo or Current Contraceptive Program (CCP). The model followed a hypothetical cohort of 15-year old girls over a lifetime horizon. Data were obtained from the Uganda National Demographic and Health Survey and from published and unpublished sources. Costs, life expectancy, disability-adjusted life expectancy, pregnancies, fertility and incremental cost-effectiveness measured as cost per life-year (LY) gained, cost per disability-adjusted life-year (DALY) averted, cost per pregnancy averted and cost per unit of fertility reduction were calculated. Univariate and probabilistic sensitivity analyses were performed to examine the robustness of results. **RESULTS:** Mean discounted life expectancy and disability-adjusted life expectancy (DALE) were higher under the NCP vs. CCP (28.74 vs. 28.65 years and 27.38 vs. 27.01 respectively). Mean pregnancies and live births per woman were lower for the NCP (9.51 vs. 7.90 and 6.92 vs. 5.79 respectively). Mean lifetime societal costs per woman were higher for the NCP from the societal perspective ($1,074 vs. $1,041) and the governmental perspective ($448 vs. $397). The incremental cost-effectiveness ratio comparing the NCP to the CCP was $88 per DALY averted (societal perspective) and $138 per DALY averted (governmental perspective). The results were robust to univariate and probabilistic sensitivity analysis. **CONCLUSIONS:** Universal access to modern contraceptives in Uganda appears to be highly cost-effective. Increasing contraceptive coverage should be considered among Uganda's public health priorities.